

What is claimed is:

1           1.     A remote controlled garage door opening and closing system,  
2 comprising:

3                     a mechanism operably connected to a garage door to open or close  
4 said door in response to a command signal;

5                     a plurality of transmitters operably generating respective  
6 changeable hopping code signals, each hopping code signal comprising an  
7 encrypted first synchronization value;

8                     a receiver for intercepting said changeable hopping code signals;  
9                     first means within said receiver for operably generating unique  
10 multibit secret keys respectively identifiably associated with said plurality  
11 of transmitters; and

12                     second means within said receiver (i) for performing a non-linear  
13 decoding function on an intercepted changeable hopping code signal using  
14 one of said multibit secret keys, thereby to generate a second  
15 synchronization value (ii) for comparing said second synchronization value  
16 with said first synchronization value and generating said command signal  
17 when said second synchronization value bears a predetermined matching  
18 relationship with said first synchronization value (iii) in the absence of  
19 said predetermined matching relationship, for performing another non-  
20 linear decoding function on said intercepted signal using a different one  
21 of said multibit secret keys to generate another second synchronization  
22 value, and (iv) for continually repeating the sequence until a second  
23 synchronization value is found which bears the said predetermined  
24 matching relationship with said first synchronization value.

1           2.     The system as recited in Claim 1, wherein said first  
2 synchronization value increments every time its associated transmitter is activated.

1           3.     The system as defined by Claim 1, wherein said plurality of  
2 transmitters have associated therewith multibit secret keys respectively  
3 corresponding to, but being separate from, the multibit secret keys associated with  
4 the receiver.

1           4.     A remote controlled garage door opening and closing system,  
2 comprising:

3                 a mechanism operably connected to a garage door to open or close  
4 said door in response to a command signal;

5                 a plurality of transmitters operably generating respective  
6 changeable hopping code signals, each hopping code signal comprising an  
7 encrypted first synchronization value;

8                 a receiver for intercepting said changeable hopping code signals;

9                 first means within said receiver for operably generating unique  
10 multibit secret keys respectively identifiably associated with said plurality  
11 of transmitters;

12                 second means within said receiver (i) for performing a non-linear  
13 decoding function on an intercepted changeable hopping code signal using  
14 one of said multibit secret keys, thereby to generate a second  
15 synchronization value (ii) for comparing said second synchronization value  
16 with said first synchronization value and generating said command signal  
17 when said second synchronization value bears a predetermined matching  
18 relationship with said first synchronization value (iii) in the absence of  
19 said predetermined matching relationship, for performing another non-  
20 linear decoding function on said intercepted signal using a different one  
21 of said multibit secret keys to generate another second synchronization  
22 value, and (iv) for continually repeating the sequence until a second  
23 synchronization value is found which bears the said predetermined  
24 matching relationship with said first synchronization value;

25                 a microprocessor associated with said receiver; and

26                 third means for controlling the mode of operation of said  
27 microprocessor between a learn mode and an operate mode, said third means  
28 being operable to place said microprocessor in a learn mode for a  
29 predetermined length of time and automatically returning said  
30 microprocessor to the operate mode at the end of said time.

1           5.     A remote controlled garage door opening and closing system,  
2 comprising:

3                 a mechanism operably connected to a garage door to open or close  
4 said door in response to a command signal;

5                 a plurality of transmitters operably generating respective  
6 changeable hopping code signals, each hopping code signal comprising an  
7 encrypted first synchronization value;

8                 a receiver for intercepting said changeable hopping code signals;

9                 first means within said receiver for operably generating unique  
10 multibit secret keys respectively identifiably associated with said plurality  
11 of transmitters;

12                 second means within said receiver (i) for performing a non-linear  
13 decoding function on an intercepted changeable hopping code signal using  
14 one of said multibit secret keys, thereby to generate a second  
15 synchronization value (ii) for comparing said second synchronization value  
16 with said first synchronization value and generating said command signal  
17 when said second synchronization value bears a predetermined matching  
18 relationship with said first synchronization value (iii) in the absence of  
19 said predetermined matching relationship, for performing another non-  
20 linear decoding function on said intercepted signal using a different one  
21 of said multibit secret keys to generate another second synchronization  
22 value, and (iv) for continually repeating the sequence until a second  
23 synchronization value is found which bears the said predetermined  
24 matching relationship with said first synchronization value;

25                 memory means within said receiver; and

26                 third means within said receiver for automatically and randomly  
27 storing said multibit secret keys in said memory means without user  
28 intervention.  
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